DOCUMENT RESUME

ED 304 098 IR 013 636

AUTHOR Pike, Daniel W.; Weisbender, Leo
TITLE Microcomputers in Instruction, Los Angeles Unified School District, 1984-85 through 1986-87. Publication No. 500.
INSTITUTION Los Angeles Unified School District, Calif. Research and Evaluation Branch.
PUB DATE Sep 87
NOTE 56p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; Computer Terminals; Elementary Secondary Education; Magnet Schools; *Microcomputers; School Surveys; Self Concept; Special Education; Student Motivation; Teaching Methods; *Use Studies
IDENTIFIERS Apple Microcomputers

ABSTRACT

In October 1984, 1985, and 1986, as part of the annual School Program Survey all elementary, secondary, and adult school principals in the Los Angeles School District were asked to provide information on their current computer usage and estimates for coming semesters. This report analyses the data for each semester in the 1984-85 to 1986-87 school years and presents the results by types of school. The brief narrative report indicates that: (1) elementary schools showed a dramatic increase in student use of computers between fall 1984 and fall 1986; (2) elementary students using microcomputers and terminals increased by 70% while the computer rooms at the schools increased fourfold; (3) secondary schools evidenced a dramatic increase in students' using microcomputers but a sharp decrease in their using terminals; (4) Apple computers continued to be the dominant brand used in both elementary and secondary schools, with an increase of over 500% at the elementary level and a tenfold increase at the secondary level in the past two years; and (5) magnet, special education, and adult schools followed the pattern that was typical of elementary schools, with a dramatic increase in students' using microcomputers and terminals and a sharp increase in Apple computers. Several areas for investigation with the intent of improving instruction are suggested. Results of the data analyses, which make up the major part of the report, are presented in 38 tables. (9 references) (CGD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED304098

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

MICROCOMPUTERS IN INSTRUCTION, LOS ANGELES UNIFIED SCHOOL DISTRICT, 1984-85 THROUGH 1986-87

PUBLICATION NO. 500

EARCH & EVALUATION BRANCH

LOS ANGELES UNIFIED SCHOOL DISTRICT

TM013634

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Floraline Stevens

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

MICROCOMPUTERS IN INSTRUCTION, LOS ANGELES UNIFIED SCHOOL DISTRICT, 1984-85 THROUGH 1986-87

Publication No. 500

This Report Was Prepared by

Daniel W. Pike
Leo Weisbender

Research and Evaluation Branch
Los Angeles Unified School District

September 1987

LOS ANGELES UNIFIED SCHOOL DISTRICT

LEONARD M. BRITTON
Superintendent

APPROVED:

FLORALINE I. STEVENS
Director
Research and Evaluation Branch

TABLE OF CONTENTS

List of Tables iv

List of Figures vi

Executive Summary 1

Introduction 2

Background 2

Procedure 3

Findings 3

Recommendations 4

References 43

LIST OF TABLES

Table		Page
1	District-Wide Computer Usage: All Schools	10
2	District-Computer Usage: Elementary Schools	11
3	District-Wide Computer Usage: Junior High Schools	12
4	District-Wide Computer Usage: Senior High Division	13
5	District-Wide Computer Usage: Magnet/Other	14
6	Region A Computer Usage: Elementary Schools	15
7	Region B Computer Usage: Elementary Schools	16
8	Region C Computer Usage: Elementary Schools	17
9	Region D Computer Usage: Elementary Schools	18
10	Region E Computer Usage: Elementary Schools	19
11	Region F Computer Usage: Elementary Schools	20
12	Region G Computer Usage: Elementary Schools	21
13	Region H Computer Usage: Elementary Schools	22
14	Region A Computer Usage: Junior High Schools	23
15	Region B Computer Usage: Junior High Schools	24
16	Region C Computer Usage: Junior High Schools	25
17	Region D Computer Usage: Junior High Schools	26
18	Region E Computer Usage: Junior High Schools	27
19	Region F Computer Usage: Junior High Schools	28
20	Region G Computer Usage: Junior High Schools	29
21	Region H Computer Usage: Junior High Schools	30

LIST OF TABLES (Continued)

Table		Page
22	Senior High Division Computer Use: Senior High Schools	31
23	Senior High Division Computer Use: Magnet/Other	32
24	Region A Computer Usage: Magnet/Other	33
25	Region B Computer Usage: Magnet/Other	34
26	Region C Computer Usage: Magnet/Other	35
27	Region D Computer Usage: Magnet/Other	36
28	Region E Computer Usage: Magnet/Other	37
29	Region F Computer Usage: Magnet/Other	38
30	Region G Computer Usage: Magnet/Other	39
31	Region H Computer Usage: Magnet/Other	40
32	District-Wide Computer Usage: Special Education Division	41
33	District-Wide Computer Usage: Division of Adult and Occupational Education	42

LIST OF FIGURES

Figure		Page
1	Number of microcomputer units from 1984 to 1986 in the Los Angeles Unified School District	5
2	Number of microcomputer units from 1984 to 1986 for elementary schools in the Los Angeles Unified School District	6
3	Number of microcomputer units from 1984 to 1986 for junior high schools in the Los Angeles Unified School District	7
4	Number of microcomputer units from 1984 to 1986 for senior high schools in the Los Angeles Unified School District	8
5	Number of microcomputer units from 1984 to 1986 for magnet schools in the Los Angeles Unified School District	9

EXECUTIVE SUMMARY

In October 1984, 1985, and 1986, as part of the Annual School Program Survey, and primarily at the request of the Office of Instruction, all elementary, secondary, and adult school principals were asked to provide information concerning computer usage for the present and estimates for coming semesters. Data are summarized for each semester in the 1984-85 to 1986-87 school years and presented by type of school.

Elementary schools showed a dramatic increase in student use of computers between fall 1984 and fall 1986. Students using microcomputers and terminals increased by 70% while the computer rooms at the schools increased fourfold. Apple computers continue to be the dominant ones used in elementary schools, with an increase of over 500% in the past 2 years.

Secondary schools evidenced a dramatic increase in students' using microcomputers but a sharp decrease in their using terminals. The Apple computer continues to be the microcomputer that is most widely used, with a tenfold increase in the past 2 years.

Magnet, special education, and adult schools follow the pattern that is typical of elementary schools, with a dramatic increase in students' using microcomputers and terminals and a sharp increase in Apple computers.

INTRODUCTION

The effect of computer assisted instruction (CAI) has been an area of increasing interest in recent years. Researchers have suggested that CAI increases performance in math (Kanevsky, 1985), reading (Geller and Shugoll, 1985), and writing (Prinz and Nelson, 1985) in a variety of school age children. CAI has also been linked to increases in creative problem solving skills (Riding and Powell, 1986). Perhaps the most compelling evidence to suggest the positive effects of CAI comes from Kulik's (1986) meta analysis. Kulik (1986) reviewed 24 controlled research studies and concluded that CAI raised exam scores and reduced instructional time.

In addition to increasing academic skills, CAI has also been effective in fostering creative thinking and a positive attitude toward school. Wismar (1985) suggested that CAI increased student motivation to complete school work and also helped convergent and divergent thinking processes. Eisenberg (1986) suggested that CAI increased student motivation and resulted in a positive self-concept. Adams and Fuchs (1986) highlighted positive student self-concept and increased coping and social skills as positive student by-products.

CAI assisted instruction has also been shown to be effective with disadvantaged and nontraditional learners. Griswold (1985) suggested that CAI increased student achievement, reduced learning time, and established a positive attitude toward school work with lower ability and disadvantaged students.

With the bulk of research studies suggesting that CAI has a positive effect on student learning, it is important to review the implementation of classroom computers in the Los Angeles Unified School District.

BACKGROUND

Each October, principals are asked to provide information about their schools in the Annual School Program Survey. For the past 3 years, primarily at the request of the Office of Instruction, a series of questions outlining the current and estimated future computer usage was included in the spring survey. Principals were asked to report the number of students using microcomputers and terminals, the number of rooms that house computers, and the number and types of various microcomputers at the school.

The purpose of this report was to outline present computer usage and the trends that are occurring in the district. A series of summary tables show computer usage for the past 3 years for elementary, junior high, senior high, magnet, special education, and adult division schools.

PROCEDURE

In October 1984, 1985, and 1986, Form 3 (K-12 sites) and Form 5 (adult education sites) of the Annual School Program Survey were given to principals in each school. The principals were asked to provide a count of students using computers, a count of computer rooms, and the number of computers by type. In addition, they were asked to estimate these figures for the coming semester.

After the forms were returned and keypunched, computer programmers in Information Services Division formatted a report using the Form 3 and Form 5 data. The summary tables for the present report were developed from that listing.

FINDINGS

Tables 1 through 32 present summary information on computer usage for elementary, junior high, senior high, magnets, special education, and adult division schools. This information was presented for fall 1984, 1985, and 1986, and an estimation of resources for spring 1985, 1986, and 1987. For ease of reading, the actual values (fall 1984, fall 1985, and fall 1986) are presented in boldface print.

Elementary schools showed a dramatic increase in computer facilities and the number of students who used the computers from 1984 to 1986. The number of students who used microcomputers and terminals increased by 70% (Table 2) while computer rooms increased by 342% and terminals increased by 268%. The district acquired over 3,000 new Apple computers for elementary schools, representing a 434% increase. (Figure 2.)

The junior high schools also showed a large increase in facilities and student use of computers from 1984 to 1986. The number of computer rooms and terminals nearly tripled, while the number of students using microcomputers increased by 127% (Table 3). In contrast, the number of students using terminals dropped 44%, despite the increase in available terminals at the schools. The number of Apple computers increased dramatically from 1,537 units in fall 1984 to 11,962 units in fall 1986 (1,378%), while other types of computers showed a moderate increase. (Figure 3.)

Senior high schools had a pattern in computer use similar to that of junior high schools. Computer rooms (55% increase), computer terminals (98% increase), and the number of students using microcomputers (55% increase) showed a large increase (Table 4), while only half the number of students were using terminals compared to 2 years ago. The number of Apple computers has increased by 600% while Commodore/Pet/Vic computer usage has dramatically dropped. (Figure 4.)

Magnet schools have also increased their computer usage, with the number of students using microcomputers increasing 88% (Table 5) and terminal usage, 140%. The facilities also grew, with a 169% rise in computer rooms and a 216% increase in terminals. The number of Apple and IBM computers showed dramatic increases of 980% and 1,155%, respectively. (Figure 5.)

The Special Education Division has also seen a rise in facilities and students using computers. In 1984, there were relatively few students using computers. Since that time, over 1,700 students are using microcomputers (Table 32) and almost 300 students are using computer terminals. Facilities have grown to 75 computer rooms and 83 terminals at the schools. Apple appears to be the microcomputer of choice, with 152 units in operation.

The Division of Adult and Occupational Education and magnet schools had a similar pattern of computer usage. Students using microcomputers and terminals, as well as computer rooms and terminals at adult schools, increased dramatically. In addition, there was a sharp rise in the number of Apple computers and IBM computers at the schools.

Table 1 presents summary information for computer usage for the Los Angeles Unified School District. The findings suggest that more students are using microcomputers and there are more terminals and rooms available at the schools. Schools have acquired large numbers of Apple and IBM instruments, and there have been fewer purchases of other types of microcomputer equipment. (Figure 1.)

RECOMMENDATIONS

The information in this report suggests several research questions to investigate, with the intent of improving instruction:

1. What factors account for decreases in computer use?

2. How do teachers combine computer use with instruction?

3. What computer applications are students making frequently: CAI? drill? problem-solving?

4. What relationship exists between a computer application (e.g., drill) and academic skills or achievement?

5. What additional skills and knowledge do teachers need in order to make fuller use of computers in instruction?

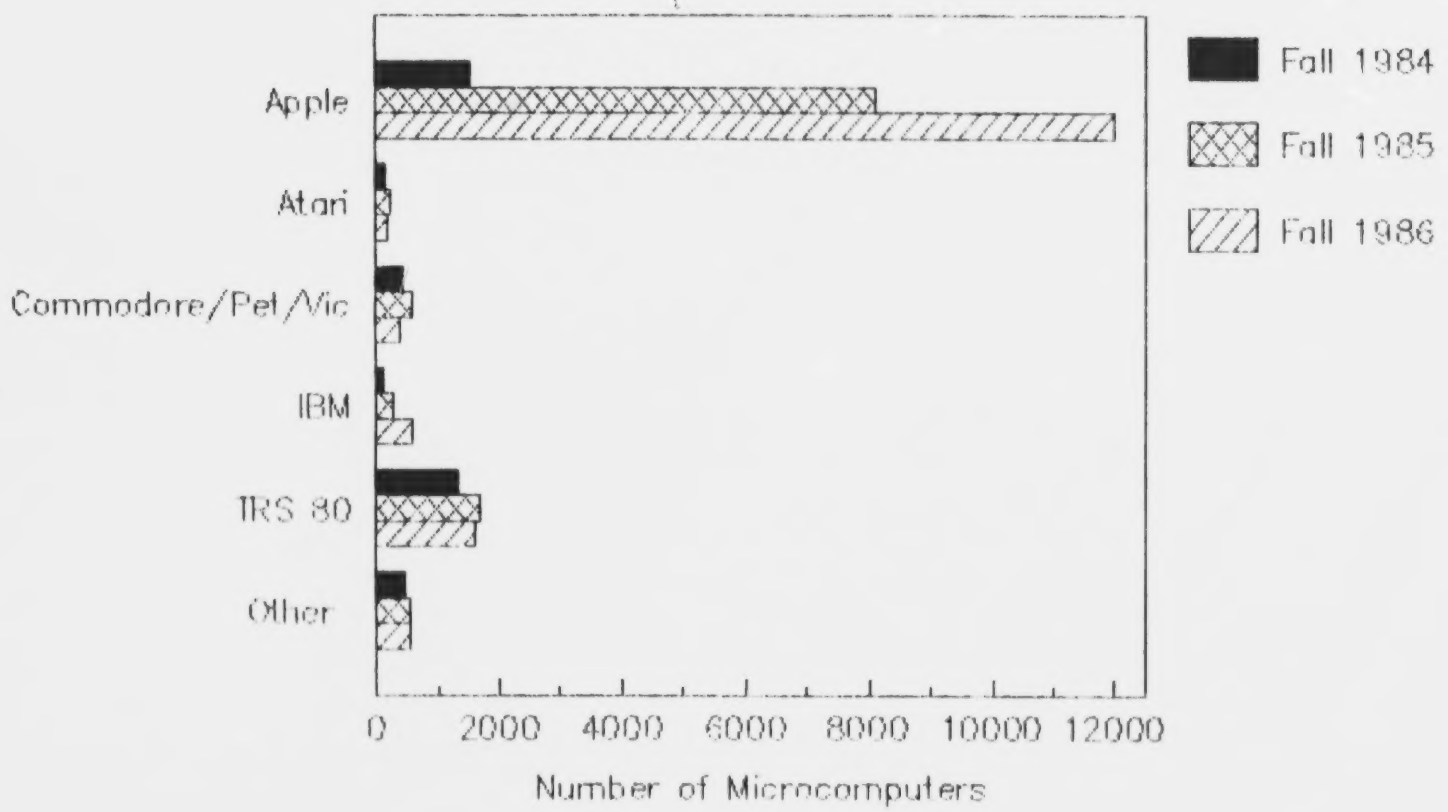

Figure 1. Number of microcomputer units from 1984 to 1986 in the Los Angeles Unified School District.

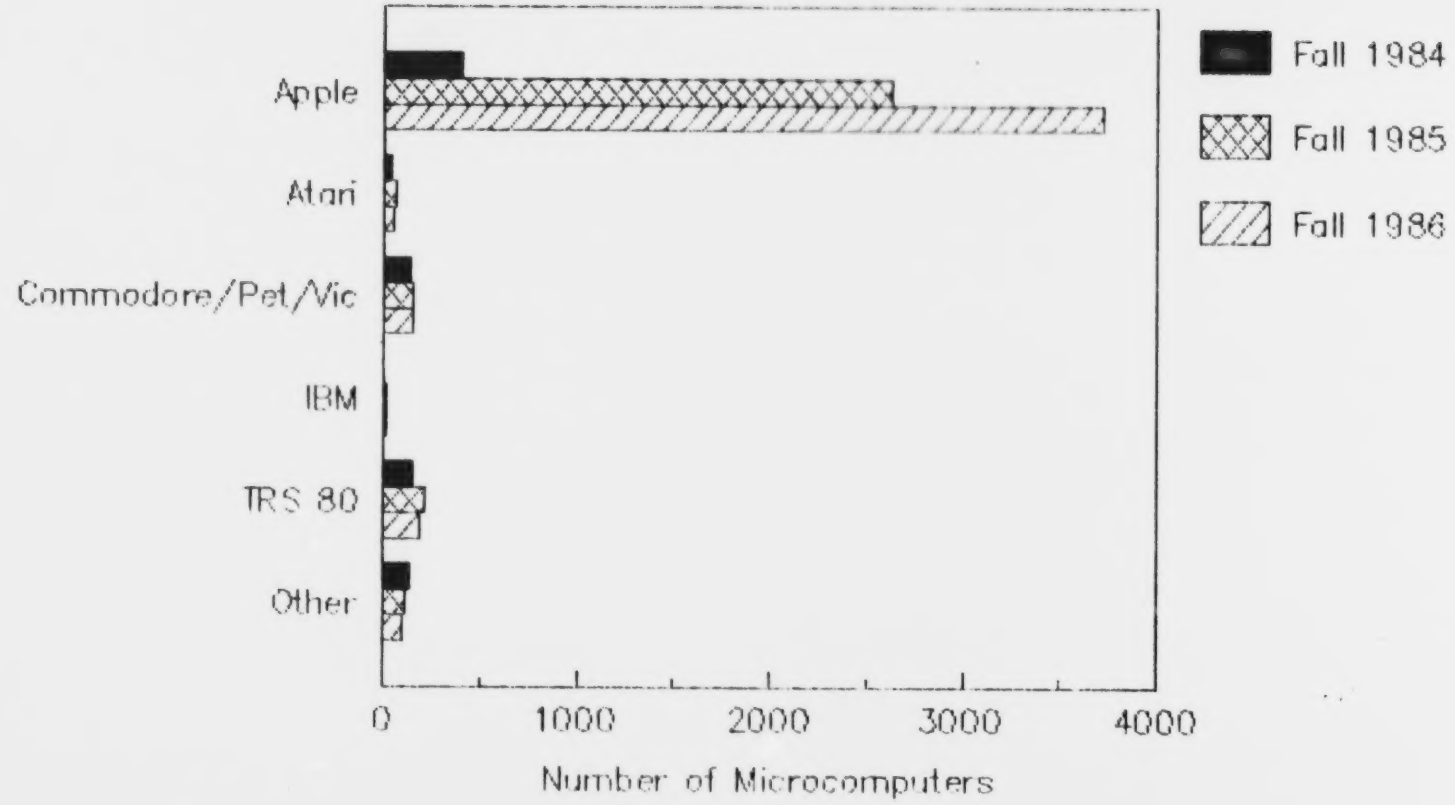

Figure 2. Number of microcomputer units from 1984 to 1986 for elementary schools in the Los Angeles Unified School District.

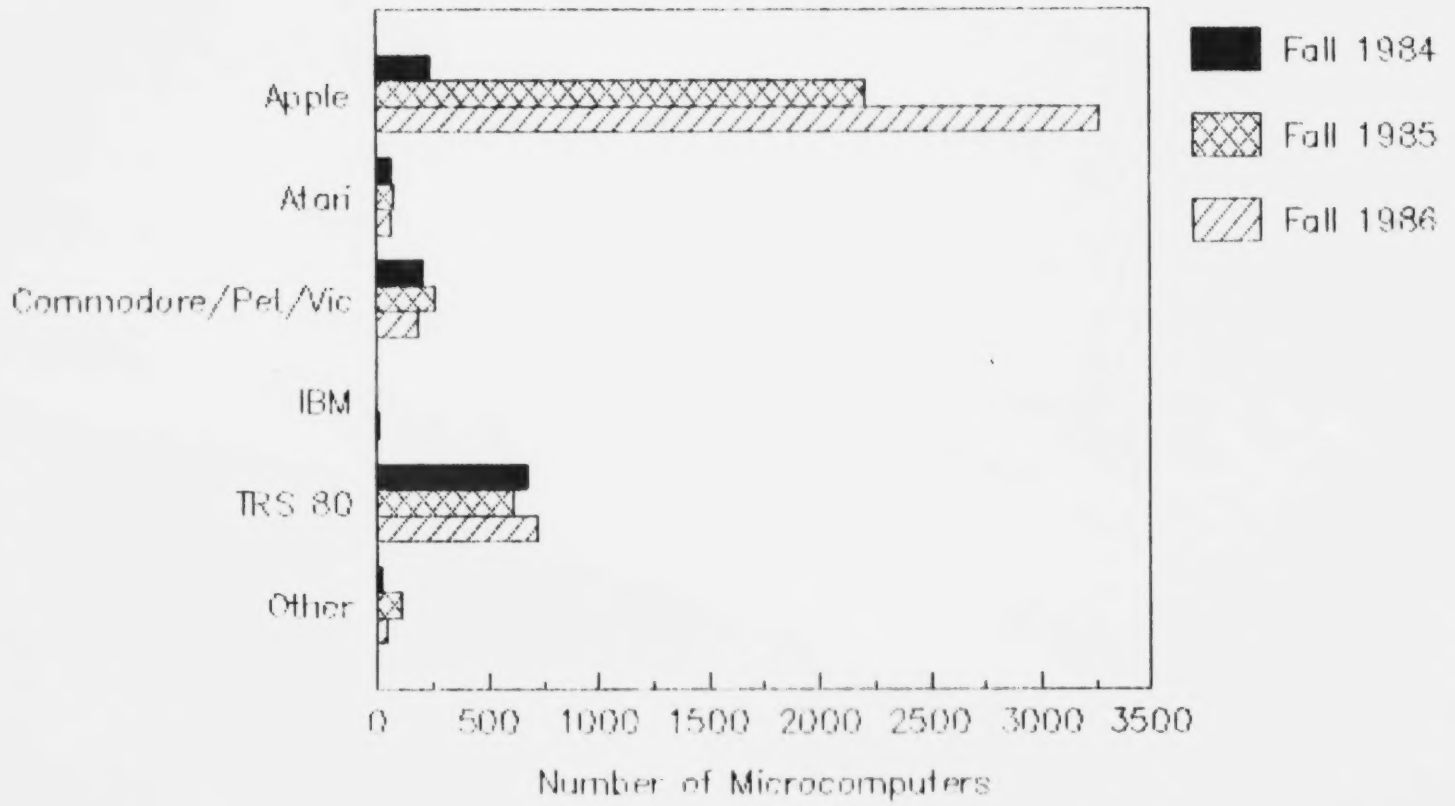

Figure 3. Number of microcomputer units from 1984 to 1986 for junior high schools in the Los Ageles Unified School District.

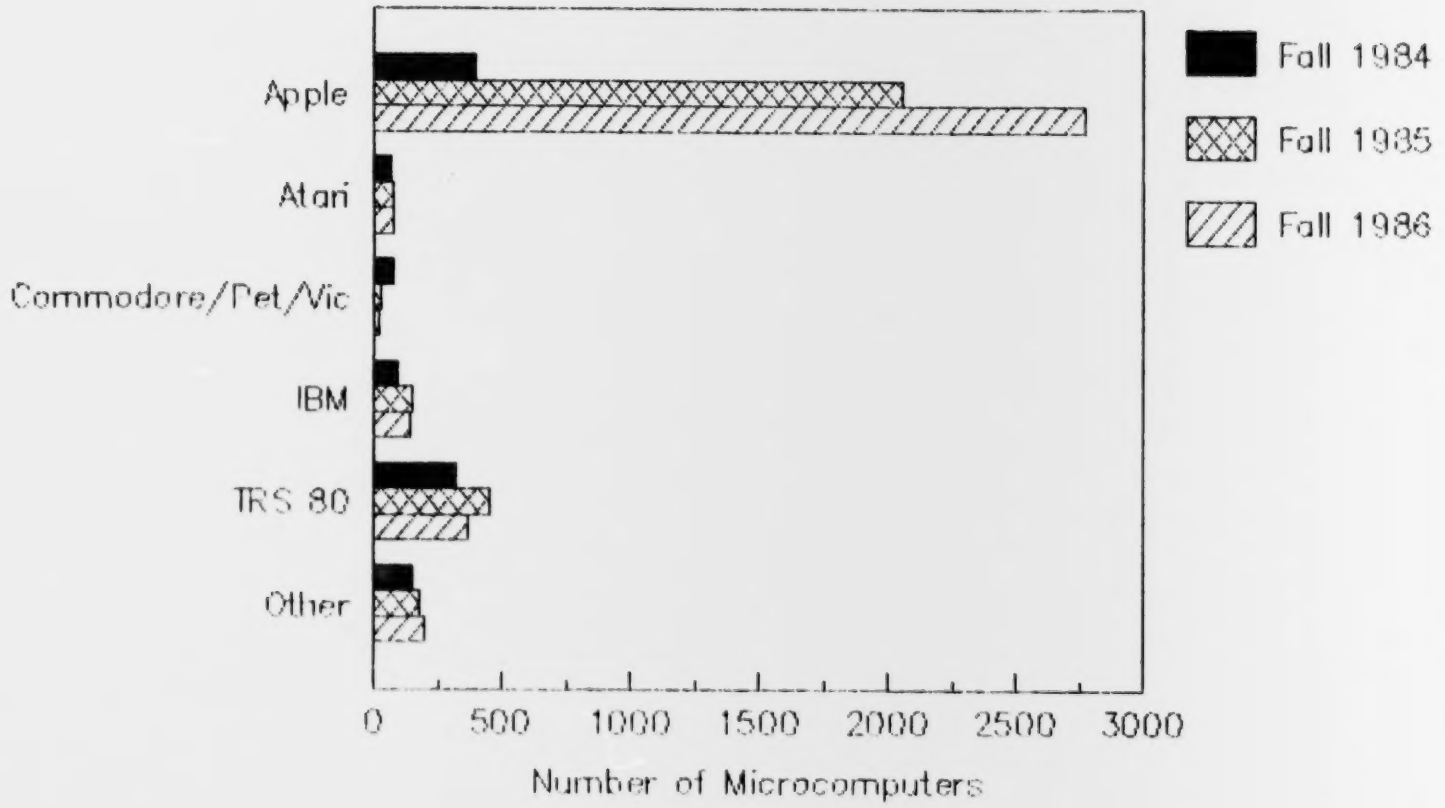

Figure 4. Number of microcomputer units from 1984 to 1986 for senior high schools in the Los Angeles Unified School District.

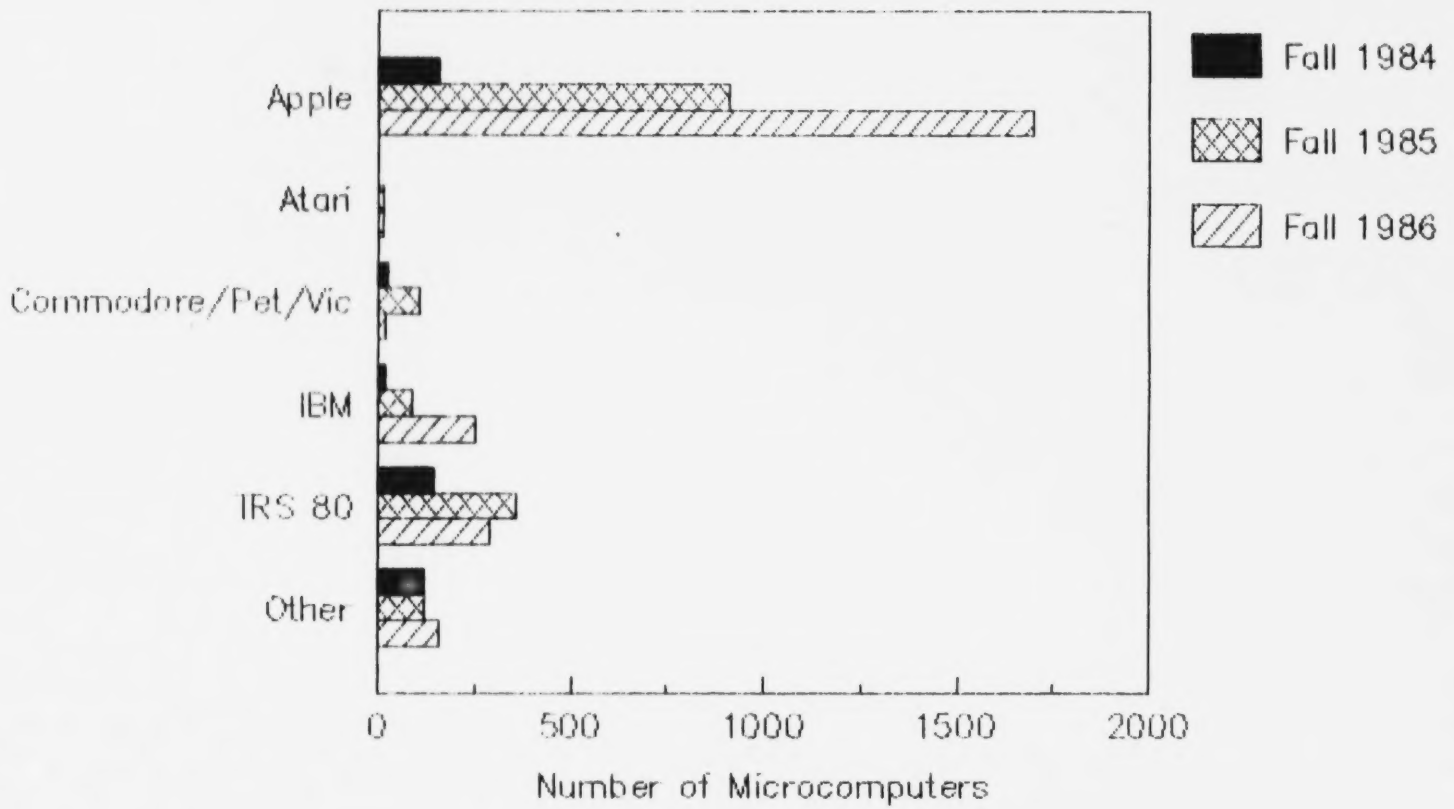

Figure 5. Number of microcomputer units from 1984 to 1986 for magnet schools in the Los Angeles Unified School District.

Table 1

District-Wide Computer Usage: All Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**100,857**	125,095	**153,865**	177,110	**173,368**	205,247
Students using terminals	**17,337**	20,578	**22,533**	24,929	**19,125**	21,307
Computer rooms at school	**1,215**	-	**3,035**	-	**4,095**	-
Terminals at school	**1,302**	-	**2,377**	-	**3,779**	-
Apples at school	**1,537**	2,891	**8,091**	10,158	**11,962**	14,584
Ataris at school	**153**	208	**216**	214	**188**	201
Commodore/Pet/ Vic at school	**438**	580	**567**	577	**374**	382
IBMs at school	**119**	242	**287**	355	**575**	1,150
TRS 80s at school	**1,322**	1,572	**1,698**	1,748	**1,608**	1,609
Other computers at school	**472**	542	**548**	576	**560**	577
Total micros at school	**4,041**	6,045	**11,407**	13,636	**15,267**	18,503

Note. Actual values printed in boldface.

Table 2

District-Wide Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**55,947**	71,953	**84,889**	100,421	**94,861**	116,742
Students using terminals	**6,079**	7,959	**9,585**	10,784	**10,320**	11,715
Computer rooms at school	**602**	-	**1,801**	-	**2,664**	-
Terminals at school	**219**	-	**527**	-	**806**	-
Apples at school	**698**	1,141	**2,623**	3,378	**3,726**	5,004
Ataris at school	**30**	37	**58**	59	**45**	53
Commodore/Pet/ Vic at school	**135**	187	**152**	158	**148**	153
IBMs at school	**1**	6	**5**	11	**6**	58
TRS 80s at school	**145**	219	**210**	221	**185**	185
Other computers at school	**135**	176	**111**	115	**97**	108
Total micros at school	**1,144**	1,766	**3,159**	3,942	**4,207**	5,561

Note. Actual values printed in boldface.

Table 3

District-Wide Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**18,899**	21,579	**28,508**	30,906	**33,090**	34,635
Students using terminals	**5,589**	5,991	**4,777**	5,025	**3,116**	3,262
Computer rooms at school	**131**	-	**263**	-	**384**	-
Terminals at school	**397**	-	**712**	-	**1,188**	-
Apples at school	**237**	401	**2,209**	2,601	**3,267**	3,643
Ataris at school	**60**	66	**75**	80	**62**	62
Commodore/Pet/ Vic at school	**206**	271	**259**	259	**186**	186
IBMs at school	**0**	0	**1**	1	**8**	34
TRS 80s at school	**678**	792	**607**	635	**721**	721
Other computers at school	**21**	27	**102**	102	**45**	45
Total micros at school	**1,202**	1,557	**3,253**	3,678	**4,289**	4,691

Note. Actual values printed in boldface.

Table 4

District-Wide Computer Usage: Senior High Division

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**14,986**	18,878	**25,932**	28,599	**23,233**	25,841
Students using terminals	**4,253**	5,006	**6,054**	6,254	**2,110**	2,262
Computer rooms at school	**244**	-	**535**	-	**377**	-
Terminals at school	**421**	-	**639**	-	**833**	-
Apples at school	**396**	725	**2,052**	2,549	**2,774**	3,168
Ataris at school	**61**	93	**72**	64	**72**	77
Commodore/Pet/ Vic at school	**70**	77	**24**	25	**11**	12
IBMs at school	**93**	176	**152**	155	**136**	174
TRS 80s at school	**318**	348	**453**	457	**362**	362
Other computers at school	**149**	153	**172**	195	**194**	196
Total micros at school	**1,087**	1,572	**2,925**	3,453	**3,549**	3,989

Note. Actual values printed in boldface.

Table 5

District-Wide Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**9,155**	10,298	**11,779**	13,879	**17,180**	20,823
Students using terminals	**1,091**	1,241	**1,454**	2,173	**2,619**	2,835
Computer rooms at school	**188**	-	**352**	-	**506**	-
Terminals at school	**207**	-	**329**	-	**655**	-
Apples at school	**157**	441	**909**	1,237	**1,697**	2,152
Ataris at school	**2**	12	**11**	11	**9**	9
Commodore/Pet/ Vic at school	**22**	34	**104**	106	**21**	22
IBMs at school	**20**	54	**90**	120	**251**	489
TRS 80s at school	**143**	174	**356**	363	**286**	287
Other computers at school	**116**	127	**118**	119	**156**	159
Total micros at school	**460**	842	**1,588**	1,956	**2,420**	3,118

Note. Actual values printed in boldface.

Table 6

Region A Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**4,686**	6,403	**6,999**	10,423	**8,433**	10,815
Students using terminals	**1,132**	1,053	**775**	1,034	**380**	573
Computer room at school	**55**	-	**188**	-	**221**	-
Terminals at school	**11**	-	**29**	-	**37**	-
Apples at school	**70**	92	**246**	316	**348**	480
Ataris at school	**3**	3	**7**	0	**5**	5
Commodore/Pet/ Vic at school	**4**	5	**6**	0	**3**	3
IBMs at school	**0**	0	**0**	1	**0**	8
TRS 80s at school	**2**	2	**3**	0	**2**	2
Other computers at school	**0**	0	**0**	0	**1**	1
Total micros at school	**79**	102	**262**	333	**359**	499

Note. Actual values printed in boldface.

Table 7

Region B Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**6,889**	9,076	**13,255**	14,819	**13,248**	15,338
Students using terminals	**584**	1,226	**3,784**	3,991	**1,310**	1,583
Computer rooms at school	**43**	-	**198**	-	**548**	-
Terminals at school	**32**	-	**155**	-	**124**	-
Apples at school	**46**	108	**314**	410	**504**	638
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**29**	50	**30**	33	**35**	38
IBMs at school	**0**	0	**3**	6	**3**	8
TRS 80s at school	**61**	98	**101**	110	**92**	92
Other computers at school	**6**	10	**4**	0	**12**	12
Total micros at school	**142**	266	**452**	563	**646**	788

Note. Actual values printed in boldface.

Table 8

Region C Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**6,578**	9,505	**12,173**	14,059	**13,019**	14,817
Students using terminals	**1,474**	2,159	**939**	1,018	**981**	1,439
Computer rooms at school	**63**	-	**235**	-	**287**	-
Terminals at school	**44**	-	**39**	-	**172**	-
Apples at school	**89**	191	**352**	415	**460**	626
Ataris at school	**7**	7	**5**	6	**5**	5
Commodore/Pet/ Vic at school	**27**	37	**24**	26	**19**	19
IBMs at school	**0**	0	**0**	1	**0**	20
TRS 80s at school	**5**	6	**12**	13	**12**	12
Other computers at school	**30**	42	**18**	21	**5**	7
Total micros at school	**158**	199	**411**	482	**501**	689

Note. Actual values printed in boldface.

Table 9

Region D Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**9,186**	10,886	**11,789**	12,950	**12,428**	15,587
Students using terminals	**252**	344	**325**	359	**601**	603
Computer rooms at school	**105**	-	**268**	-	**323**	-
Terminals at school	**20**	-	**67**	-	**85**	-
Apples at school	**117**	167	**381**	512	**540**	701
Ataris at school	**17**	23	**28**	28	**29**	29
Commodore/Pet/ Vic at school	**43**	51	**60**	61	**58**	60
IBMs at school	**0**	0	**0**	0	**0**	3
TRS 80s at school	**2**	13	**15**	15	**12**	12
Other computers at school	**33**	46	**30**	30	**16**	25
Total micros at school	**212**	300	**514**	546	**655**	830

Note. Actual values printed in boldface.

Table 10

Region E Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**8,655**	11,179	**11,714**	13,816	**12,788**	16,098
Students using terminals	**629**	700	**562**	597	**1,444**	1,635
Computer rooms at school	**129**	-	**224**	-	**291**	-
Terminals at school	**24**	-	**32**	-	**71**	-
Apples at school	**105**	142	**337**	427	**450**	640
Ataris at school	**0**	0	**1**	1	**0**	0
Commodore/Pet/ Vic at school	**17**	17	**16**	16	**19**	19
IBMs at school	**1**	0	**1**	1	**0**	3
TRS 80s at school	**18**	18	**12**	12	**15**	15
Other computers at school	**17**	18	**22**	22	**16**	16
Total micros at school	**158**	196	**389**	479	**500**	693

Note. Actual values printed in boldface.

Table 11

Region F Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**7,791**	9,265	**12,823**	14,826	**13,456**	16,931
Students using terminals	**315**	324	**613**	819	**2,068**	1,973
Computer rooms at school	**68**	-	**243**	-	**256**	-
Terminals at school	**28**	-	**31**	-	**75**	-
Apples at school	**87**	150	**374**	473	**446**	645
Atris at school	**3**	4	**5**	5	**3**	11
Commodore/Pet/ Vic at school	**0**	0	**1**	1	**1**	1
IBMs at school	**0**	4	**1**	1	**1**	9
TRS 80s at school	**22**	42	**33**	34	**18**	18
Other computers at school	**23**	26	**20**	20	**17**	17
Total micros at school	**135**	226	**434**	534	**486**	701

Note. Actual values printed in boldface.

Table 12

Region G Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**6,256**	7,243	**8,337**	10,224	**10,524**	13,721
Students using terminals	**187**	280	**1,127**	1,296	**1,988**	2,299
Computer rooms at school	**67**	-	**215**	-	**287**	-
Terminals at School	**18**	-	**78**	-	**114**	-
Apples at school	**88**	122	**286**	401	**469**	626
Ataris at school	**0**	0	**11**	11	**3**	3
Commodore/Pet/ Vic at school	**13**	25	**12**	12	**10**	10
IBMs at school	**0**	0	**0**	1	**0**	4
TRS 80s at school	**17**	18	**17**	17	**18**	18
Other computers at school	**10**	12	**11**	11	**14**	14
Total micros at school	**128**	177	**387**	503	**514**	675

Note. Actual values printed in boldface.

Table 13

Region H Computer Usage: Elementary Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**5,897**	8,396	**7,799**	9,304	**10,965**	13,435
Students using terminals	**1,506**	1,873	**1,460**	1,640	**1,548**	1,610
Computer rooms at school	**72**	-	**230**	-	**451**	-
Terminals at school	**42**	-	**96**	-	**128**	-
Apples at school	**96**	169	**333**	424	**509**	648
Ataris at school	**0**	0	**1**	1	**0**	0
Commodore/Pet/ Vic at school	**2**	2	**3**	3	**3**	3
IBMs at school	**0**	0	**0**	0	**2**	3
TRS 80s at school	**18**	18	**17**	17	**16**	16
Other computers at school	**16**	22	**6**	7	**16**	16
Total micros at school	**132**	211	**360**	452	**546**	686

Note. Actual values printed in boldface.

Table 14

Region A Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**1,715**	2,456	**2,015**	2,925	**3,209**	3,430
Students using terminals	**42**	122	**24**	24	**0**	0
Computer rooms at school	**10**	-	**30**	-	**34**	-
Terminals at school	**2**	-	**26**	-	**0**	-
Apples at school	**24**	86	**250**	326	**395**	424
Ataris at school	**0**	0	**0**	0	**1**	1
Commodore/Pet/ Vic at school	**21**	43	**16**	16	**8**	8
IBMs at school	**0**	0	**0**	0	**0**	0
TRS 80s at school	**46**	49	**36**	36	**35**	35
Other computers at school	**1**	0	**5**	5	**1**	1
Total micros at school	**92**	179	**307**	383	**440**	469

Note. Actual values printed in boldface.

Table 15

Region B Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**2,345**	2,345	**6,060**	6,370	**4,312**	4,473
Students using terminals	**2,102**	2,107	**1,753**	1,853	**1,032**	1,075
Computer rooms at school	**22**	-	**42**	-	**44**	-
Terminals at school	**48**	-	**112**	-	**106**	-
Apples at school	**14**	33	**237**	252	**325**	351
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**39**	41	**19**	19	**11**	11
IBMs at school	**0**	0	**0**	0	**2**	2
TRS 80s at school	**61**	83	**58**	58	**43**	43
Other computers at school	**0**	1	**17**	17	**0**	0
Total micros at school	**114**	158	**331**	346	**381**	407

Note. Actual values printed in boldface.

Table 16

Region C Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**2,017**	2,697	**2,785**	2,961	**3,155**	3,255
Students using terminals	**2,032**	2,265	**2,171**	2,234	**290**	294
Computer rooms at school	**12**	-	**29**	-	**32**	-
Terminals at school	**75**	-	**72**	-	**225**	-
Apples at school	**31**	60	**236**	293	**356**	387
Ataris at school	**2**	2	**2**	2	**2**	2
Commodore/Pet/ Vic at school	**0**	10	**0**	0	**0**	0
IBMs at school	**0**	0	**0**	0	**1**	11
TRS 80s at school	**31**	33	**27**	27	**33**	33
Other computers at school	**10**	10	**11**	11	**20**	20
Total micros at school	**74**	115	**276**	333	**412**	453

Note. Actual values printed in boldface.

Table 17

Region D Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**3,328**	3,386	**3,366**	3,399	**4,937**	5,144
Students using terminals	**350**	40	**368**	407	**126**	148
Computer rooms at school	**18**	-	**28**	-	**65**	-
Terminals at school	**36**	-	**21**	-	**71**	-
Apples at school	**39**	46	**263**	329	**488**	566
Ataris at school	**0**	0	**0**	1	**0**	0
Commodore/Pet/ Vic at school	**17**	17	**43**	43	**44**	44
IBMs at school	**0**	0	**0**	0	**0**	1
TRS 80s at school	**104**	117	**97**	102	**112**	112
Other computers at school	**0**	0	**1**	1	**1**	1
Total micros at school	**160**	182	**404**	476	**645**	724

Note. Actual values printed in boldface.

Table 18

Region E Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**2,192**	2,378	**3,030**	3,243	**4,507**	3,687
Students using terminals	**709**	0	**85**	85	**967**	967
Computer rooms at school	**22**	-	**39**	-	**54**	-
Terminals at school	**47**	-	**125**	-	**154**	-
Apples at school	**28**	39	**351**	369	**535**	601
Ataris at school	**38**	44	**48**	48	**40**	40
Commodore/Pet/ Vic at school	**75**	85	**67**	67	**66**	66
IBMs at school	**0**	0	**1**	1	**1**	4
TRS 80s at school	**43**	47	**60**	60	**59**	59
Other computers at school	**0**	5	**2**	2	**1**	1
Total micros at school	**184**	220	**529**	547	**702**	771

Note. Actual values printed in boldface.

Table 19

Region F Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**3,286**	3,613	**3,472**	3,785	**3,741**	4,195
Students using terminals	**48**	86	**258**	301	**585**	662
Computer rooms at school	**28**	-	**52**	-	**66**	-
Terminals at school	**60**	-	**89**	-	**293**	-
Apples at school	**59**	90	**417**	493	**611**	663
Ataris at school	**17**	17	**22**	26	**18**	18
Commodore/Pet/ Vic at school	**28**	36	**39**	39	**37**	37
IBMs at school	**0**	0	**0**	0	**2**	14
TRS 80s at school	**49**	61	**71**	88	**122**	122
Other computers at school	**0**	0	**50**	50	**11**	11
Total micros at school	**153**	204	**599**	696	**801**	865

Note. Actual values printed in boldface.

Table 20

Region G Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**2,664**	3,124	**5,750**	5,860	**6,396**	6,396
Students using terminals	**306**	306	**118**	121	**116**	116
Computer rooms at school	**10**	-	**17**	-	**26**	-
Terminals at school	**129**	-	**237**	-	**339**	-
Apples at school	**26**	26	**248**	266	**287**	299
Ataris at school	**3**	3	**3**	3	**1**	1
Commodore/Pet/ Vic at school	**9**	9	**66**	66	**7**	7
IBMs at school	**0**	0	**0**	0	**2**	2
TRS 80s at school	**318**	358	**214**	220	**277**	277
Other computers at school	**10**	10	**0**	0	**0**	0
Total micros at school	**366**	406	**531**	555	**574**	586

Note. Actual values printed in boldface.

Table 21

Region H Computer Usage: Junior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**1,352**	1,580	**2,050**	2,363	**2,833**	4,055
Students using terminals	**0**	0	**0**	0	**0**	0
Computer rooms at school	**9**	-	**26**	-	**63**	-
Terminals at school	**0**	-	**30**	-	**0**	-
Apples at school	**16**	19	**207**	273	**270**	352
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**17**	30	**9**	9	**13**	13
IBMs at school	**0**	0	**0**	0	**0**	0
TRS 80s at school	**26**	44	**44**	44	**40**	40
Other computers at school	**0**	0	**16**	16	**11**	11
Total micros at school	**59**	83	**267**	342	**334**	416

Note. Actual values printed in boldface.

Table 22

Senior High Division Computer Use: Senior High Schools

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**12,839**	16,182	**23,802**	26,054	**23,233**	25,841
Students using terminals	**3,626**	4,330	**5,532**	5,485	**2,110**	2,262
Computer rooms at school	**193**	-	**414**	-	**377**	-
Terminals at school	**381**	-	**565**	-	**833**	-
Apples at school	**335**	569	**1,739**	2,118	**2,774**	3,168
Ataris at school	**61**	84	**64**	64	**72**	77
Commodore/Pet/ Vic at school	**55**	62	**21**	22	**11**	12
IBMs at school	**79**	130	**101**	104	**136**	174
TRS 80s at school	**307**	336	**364**	368	**362**	362
Other computers at school	**142**	146	**162**	184	**194**	196
Total micros at school	**979**	1,327	**2,451**	2,860	**3,549**	3,989

Note. Actual values printed in boldface.

Table 23

Senior High Division Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**2,147**	2,696	**2,130**	2,545	**3,855**	4,934
Students using terminals	**627**	676	**522**	769	**578**	681
Computer rooms at school	**51**	-	**121**	-	**147**	-
Terminals at school	**40**	-	**74**	-	**190**	-
Apples at school	**61**	156	**313**	431	**651**	801
Ataris at school	**0**	9	**8**	0	**7**	7
Commodore/Pet/ Vic at school	**15**	15	**3**	3	**7**	7
IBMs at school	**14**	46	**51**	51	**74**	85
TRS 80s at school	**11**	12	**89**	89	**114**	114
Other computers at school	**7**	7	**10**	11	**15**	17
Total micros at school	**108**	245	**474**	593	**868**	1,031

Note. Actual values printed in boldface.

Table 24

Region A Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**556**	606	**662**	1,011	**1,080**	902
Students using terminals	**0**	0	**0**	0	**439**	259
Computer rooms at school	**10**	-	**17**	-	**24**	-
Terminals at school	**1**	-	**1**	-	**30**	-
Apples at school	**2**	5	**24**	38	**30**	34
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**1**	1	**0**	0	**1**	1
IBMs at school	**1**	1	**0**	0	**0**	1
TRS 80s at school	**3**	3	**7**	7	**4**	4
Other computers at school	**4**	4	**1**	1	**0**	0
Total micros at school	**11**	14	**32**	46	**35**	40

Note. Actual values printed in boldface.

Table 25

Region B Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**35**	65	**80**	63	**138**	145
Students using terminals	**0**	-	**0**	-	**0**	-
Computer rooms at school	**4**	-	**10**	-	**9**	-
Terminals at school	**0**	-	**0**	-	**0**	-
Apples at school	**0**	0	**2**	12	**12**	15
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**0**	0	**0**	0	**0**	0
IBMs at school	**0**	0	**0**	0	**0**	0
TRS 80s at school	**2**	6	**2**	6	**2**	2
Other computers at school	**0**	0	**0**	0	**5**	5
Total micros at school	**2**	6	**4**	8	**19**	22

Note. Actual values printed in boldface.

Table 26

Region C Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**314**	380	**304**	453	**670**	735
Students using terminals	**33**	33	**55**	60	**0**	0
Computer rooms at school	**8**	-	**10**	-	**12**	-
Terminals at school	**0**	-	**9**	-	**0**	-
Apples at school	**3**	24	**13**	22	**21**	33
Ataris at school	**1**	1	**2**	2	**1**	1
Commodore/Pet/ Vic at school	**0**	6	**0**	0	**0**	0
IBMs at school	**0**	0	**0**	0	**0**	0
TRS 80s at school	**7**	7	**7**	7	**6**	6
Other computers at school	**0**	2	**0**	0	**1**	1
Total micros at school	**11**	40	**22**	31	**29**	41

Note. Actual values printed in boldface.

Table 27

Region D Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**1,563**	895	**2,563**	2,763	**2,914**	3,223
Students using terminals	**25**	27	**33**	45	**100**	120
Computer rooms at school	**37**	-	**70**	-	**69**	-
Terminals at school	**40**	-	**11**	-	**2**	-
Apples at school	**25**	33	**125**	187	**243**	372
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**1**	1	**10**	0	**1**	1
IBMs at school	**0**	0	**0**	1	**0**	1
TRS 80s at school	**11**	24	**31**	31	**19**	19
Other computers at school	**39**	39	**41**	41	**44**	44
Total micros at school	**76**	97	**207**	270	**307**	437

Notes. Actual values printed in boldface.

Table 28

Region E Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**964**	1,012	**1,172**	1,222	**1,059**	1,059
Students using terminals	**0**	0	**0**	0	**330**	330
Computer rooms at school	**6**	-	**10**	-	**26**	-
Terminals at school	**22**	-	**0**	-	**55**	-
Apples at school	**8**	9	**20**	34	**66**	77
Ataris at school	**1**	1	**1**	1	**1**	1
Commodore/Pet/ Vic at school	**0**	0	**2**	3	**4**	4
IBMs at school	**0**	0	**0**	0	**3**	6
TRS 80s at school	**26**	26	**26**	27	**9**	10
Other computers at school	**5**	5	**7**	7	**19**	19
Total micros at school	**40**	41	**56**	72	**102**	117

Note. Actual values printed in boldface.

Table 29

Region F Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**1,308**	1,829	**1,519**	1,945	**1,879**	2,038
Students using terminals	**0**	43	**181**	586	**211**	211
Computer rooms at school	**13**	-	**15**	-	**41**	-
Terminals at school	**35**	-	**2**	-	**53**	-
Apples at school	**8**	29	**51**	64	**150**	173
Ataris at school	**0**	1	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**0**	0	**1**	1	**0**	0
IBMs at school	**0**	1	**0**	0	**0**	1
TRS 80s at school	**28**	40	**28**	30	**62**	62
Other computers at school	**10**	11	**14**	14	**4**	4
Total micros at school	**46**	82	**94**	109	**216**	240

Note. Actual values printed in boldface.

Table 30

Region G Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**251**	251	**329**	310	**146**	146
Students using terminals	**81**	81	**0**	0	**1**	1
Computer rooms at school	**6**	-	**8**	-	**6**	-
Terminals at school	**11**	-	**61**	-	**1**	-
Apples at school	**1**	1	**1**	1	**5**	7
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**0**	0	**0**	0	**0**	0
IBMs at school	**0**	0	**0**	0	**0**	0
TRS 80s at school	**12**	12	**6**	6	**6**	6
Other computers at school	**0**	0	**0**	0	**0**	0
Total micros at school	**13**	13	**7**	7	**11**	13

Note. Actual values printed in boldface. Rev. 10-87

Table 31

Region H Computer Usage: Magnet/Other

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**137**	177	**263**	262	**435**	435
Students using terminals	**0**	0	**0**	0	**0**	0
Computer rooms at school	**3**	-	**7**	0	**8**	-
Terminals at school	**0**	-	**0**	-	**27**	-
Apples at school	-	1	**5**	8	**21**	23
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**0**	0	**0**	0	**0**	0
IBMs at school	**0**	0	**0**	0	**0**	0
TRS 80s at school	**5**	5	**10**	10	**10**	10
Other computers at school	**0**	0	**0**	0	**0**	0
Total micros at school	**5**	6	**15**	18	**31**	33

Note. Actual values printed in boldface.

Table 32

District-Wide Computer Usage: Special Education Division

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**806**	1,274	**1,450**	1,625	**1,720**	2,328
Students using terminals	**5**	40	**152**	203	**285**	302
Computer rooms at school	**26**	-	**37**	-	**75**	-
Terminals at school	**17**	-	**18**	-	**83**	-
Apples at school	**29**	50	**90**	128	**152**	212
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**0**	0	**0**	0	**0**	1
IBMs at school	**0**	0	**0**	0	**0**	4
TRS 80s at school	**2**	2	**3**	3	**3**	3
Other computers at school	**10**	12	**10**	10	**17**	17
Total micros at school	**41**	74	**103**	141	**172**	237

Note. Actual values printed in boldface.

Table 33

District-Wide Computer Usage: Division of Adult and Occupational Education

Item	Fall 1984	Spring 1985 (Expected)	Fall 1985	Spring 1986 (Expected)	Fall 1986	Spring 1987 (Expected)
Students using micros	**1,064**	1,113	**1,307**	1,680	**3,284**	4,878
Students using terminals	**320**	341	**511**	490	**675**	931
Computer rooms at school	**24**	-	**47**	-	**89**	-
Terminals at school	**41**	-	**152**	-	**214**	-
Apples at school	**20**	133	**208**	265	**346**	405
Ataris at school	**0**	0	**0**	0	**0**	0
Commodore/Pet/ Vic at school	**5**	11	**28**	29	**8**	8
IBMs at school	**5**	6	**39**	68	**174**	391
TRS 80s at school	**36**	37	**69**	69	**51**	51
Other computers at school	**41**	47	**35**	35	**51**	52
Total micros at school	**107**	234	**379**	466	**630**	907

Note. Actual values printed in boldface.

REFERENCES

Adams, D. R. & Fuchs, M. (1986). Using the computer for children with special needs. Momentum, 17(2), 33-34

Eisenberg, Y. (1986). The effects of computer-based instruction on college students' interest and achievement. Educational Technology, 26, 40-43.

Geller, D. & Shugoll, M. (1985). The impact of computer assisted instruction on disadvantaged young adults in a non-traditional educational environment. AEDS Journal, 19, 15-16.

Griswold, P. (1986). Computer assisted instruction: More than just a drill. Rural Educator, 17, 15-16.

Kanevsky, L. (1985). Computer-based math for gifted students: comparison of cooperative and competitive strategies. Journal for the Education of the Gifted, 8(4), 239-255.

Kulik, C. (1986). The effectiveness of computer-based adult education: A meta analysis. Journal of Educational Computering, 2, 235-252.

Prinz, P. & Nelson, K. (1985). Alligator eats cookie: Acquisition of writing and reading skills by deaf children using the microcomputer. Journal of Applied Psycholinguistics, 6, 283-306.

Riding, R. & Powerl, S. (1986). The improvement of thinking skills in young children using computer activities: A replication and extension. Educational Psychology, 6, 179-183.

Wismar, B. (1985). Microcomputers: How can they be used to enhance creative development? Journal of Creative Behavior, 19, 97-102.